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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/725,514

12/03/2003

Martin Heeney

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23599 7590 09/08/2008  
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EXAMINER

WU, SHEAN CHIU

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

09/08/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/725,514	<b>Applicant(s)</b> HEENEY ET AL.	
	<b>Examiner</b> Shean C. Wu	<b>Art Unit</b> 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 17 July 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-7, 10, 11, 13, 18, 20-28, 33, 34, 36, 40, 41, 43 and 44 is/are pending in the application.
- 4a) Of the above claim(s) 8, 9, 12, 20-23, 27, 28 and 36 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7, 10, 11, 13, 18, 24-26, 33, 34, 40, 41, 43 and 44 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) See Continuation Sheet are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

Continuation of Disposition of Claims: Claims subject to restriction and/or election requirement are 1-7,10,11,13,18,20-28,33,34,36,40,41,43 and 44.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

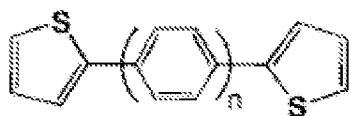
A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-7, 10-11, 24, 26, 33-34, 40-41 and 43-44 are rejected under 35 U.S.C. 102(b) as being anticipated by Lee et al. (J. Physical Chemistry).

Lee discloses organic semiconductors having conjugated polymers and oligomers with their unusual electrical and optical properties. Of special interest are electroluminescence, photoconductivity, photovoltaic effects, and the electrical conductivity of oxidized or reduced materials. These aspects make the organic semiconducting materials applicable to electronic and photonic devices such as field-effect transistors (FET) and light-emitting diodes. Oligothiophenes and oligophenylenes are typical of those materials. The reference investigates thiophene/phenylene co-oligomers with different ring numbers and arrangements to establish how the molecular size and the arrangement of the thiophenes and phenylenes influence the spectra. One of the formulas described in the reference is

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**TnP** ( $n = 1, 2$ ) (see Fig. 1), which reads on the present formula I

with sub-formula IIc in claim 1 and Ar being a biphenyl for Ic in claim 2 (see 4, 4-bis (2-thienyl) biphenyl (T2P,  $n=2$ ) in table 1 of co-oligomer on page 1829). The T2P is one of monomers in co-oligomer. Therefore, the reference co-oligomer comprising monomer of T2P for FET device anticipates the claimed invention.

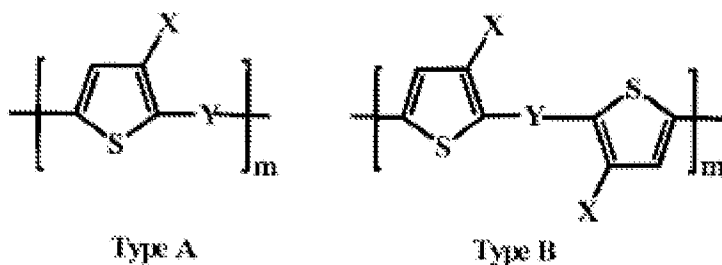
With respect to claim 5, the reference compound T2P inherently anticipates the claimed invention.

3. Claim 13 is rejected under 35 U.S.C. 102(b) as being anticipated by Ng et al. (CAPLUS 2000: 634223 or Macromolecules, 2000, vol. 33, pages 7349-7358).

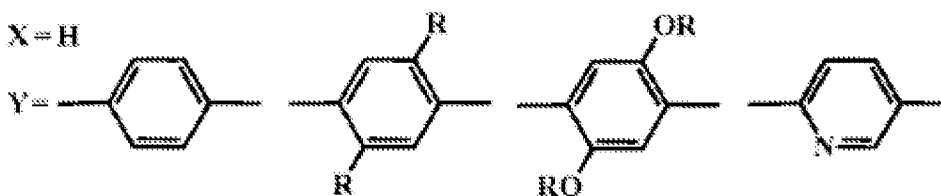
The reference discloses a polythiophene of structure type B with Y= alkyl-substituted or alkoxy-substituted phenylene, which reads on the present formula Ic with sub-formulae IIIa and IIIb. The reference polymers PBTCn having liquid crystal properties and are both p- and n-dopable. The reference discloses polythiophenes and polybithiophenes are interesting materials due to their processability and property tunability attained upon functionalization. Regioregular copolymers consisting of alternating thiophene and aromatic units have also been disclosed below

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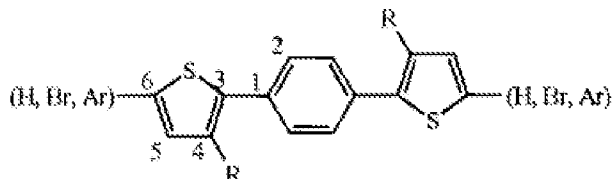
Chart 1. Polymer Structure



in which

 $X = H$ 

and

Table 3.  $^{13}\text{C}$  NMR Resonances (ppm) and Identities for the Monomers and Neutral Polymers

for examples:

1,4-Bis(5-bromo-3-butyl-2-thienyl)benzene (DBBTBC<sub>3</sub>) and1,4-Bis(3-octyl-2-thienyl)benzene (BTBC<sub>8</sub>). The reference polymers

anticipate the claimed polymer.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. (J. Physical Chemistry).

The reference differs from the claim in that the claimed device is a TFT (array) for flat panel displays. Because it is well known in the art that these electrical conductivity polymers having charge transport activity are useful for the transistor device including TFT and FET, therefore, it would have been obvious to those skilled in the art to utilize the reference polymers in the claimed devices.

6. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ng et al. (CAPLUS 2000: 634223 or Macromolecules, 2000, vol. 33, pages 7349-7358).

The reference differs from the claims in that the claimed transistor device comprises a semiconductor or charge transport material of the present formula I. It is well known in the art (for example, US 6,136,702) that these treated dopants are useful for the transistor device including TFT and FET, therefore, it would have been obvious to those skilled in the art to utilize the reference polymer in the claimed device.

***Claim Rejections - 35 USC § 112***

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7. Claims 40-41 and 44 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 40, the notations P-Sp- and n are not defined.

In claim 41, the monomers of I1a-I1c do not have an antecedent basis because the monomer with  $n=1$  ( $n \geq 1$  defined in the claims) was excluded from the formulae ( $n > 1$  in claim 1).

In claim 44, the group Ar in formula I1c is not defined.

### ***Response to Arguments***

8. Applicant's arguments, see remarks, filed 7/9/08, with respect to the rejections in the previous Office action have been fully considered but they are not persuasive and new grounds of rejection are made in the sections 2-3 and 5-7 cited above. Claim 18 is rejoined with pending claims. However, claims 20-23, 27-28 and 36 are withdrawn from the consideration because the oligomer and polymer of claim 13 can be used in different applications.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shean C. Wu whose telephone number is 571-272-1393. The examiner can normally be reached on 10:30 AM to 7:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kelly Cynthia can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Shean C Wu/  
Primary Examiner, Art Unit 1795

scw